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Agriculture and the Environment: The Philippines Case Study

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Summary

Slash-and-burn farming in the Philippine uplands once was sustainable. It no longer is. Fully 90 percent of the forest cover in the uplands has disappeared as population pressures have pushed increasing numbers of farmers into those regions. The environmental consequences have been severe: erosion, siltation, flash flooding, spread of disease, loss of wildlife habitat.

These hilly agricultural areas have become an important target of USAID/Manila's development assistance. They are where poverty is the most acute, social services the scarcest, and environmental degradation the most pronounced. Since the early 1980s USAID has fostered ways to achieve both a stable environment and steadily improved well-being for the country's upland households.

The efforts have consisted of two joint USAID/Government of the Philippine projects. First came a $6.4 million regional Farming Systems Development project. It was quickly expanded nationwide to a $44 million Rainfed Development Resources Project.

In July 1993 USAID's Center for Development Information and Evaluation (CDIE) sent a team of evaluators to the Philippines to examine how the Mission has helped develop sustainable systems of agriculture on deforested slopes. The projects, the team concluded, have been largely successful. The Philippines now stands poised to spread, over a large area, farming technologies that reverse environmental blight, offer significant returns to private cultivators, and provide external social benefits.

From its examination of 20 locations, the evaluation team found evidence that:

Deforested hillsides can be farmed in an environmentally sustainable fashion

Farming practices exist that can help restore the quality of soil and vegetative cover from degraded hilly lands

Hillside farmers can generate long-run economic returns comparable to those of lowland farmers

Limited land ownership, literacy, and credit are not insurmountable

constraints to adoption of sustainable farming technologies in upland areas

Background

Under continued population pressures, more and more Philippine farmers are moving into upland areas and clearing them for cultivation of subsistence crops. Extensive upland farming through traditional slash-and-burn practices is having serious environmental consequences. It:

Increases erosion, and that leads to soil infertility, loss of water retention, and low crop yields

Causes siltation of downstream irrigation systems

Reduces water availability and increases the incidence of waterborne diseases, such as typhoid

Destroys infrastructure and results in loss of life through flash floods

Reduces wildlife habitat

During nearly 30 years of USAID assistance, the Philippines has been in the vanguard of countries undertaking scientific and social research and experimentation. The work has generated a range of solutions to problems affecting many developing countries today. That is particularly true in agriculture.

The Philippines, for example, was host to the discovery, by the International Rice Research Institute, of the miracle rices that have staved off hunger for millions of Asians and countless more around the world. The Philippines itself has benefited from the green revolution launched on its shores. It has increased its rice yields to meet its domestic food grain needs and to release land and labor for other activities.

These accomplishments come none too soon. The Philippines faces major challenges to sustained economic growth. Nowhere are those challenges more clearly manifested than in the upland mountain areas, which have lost 90 percent of their original forest cover to subsistence farming.

USAID's Assistance Approach

Since the early 1980s USAID has been helping the Philippines develop programs aimed at managing sloping upland soils for sustainable crop production. Efforts began with a regional $6.5 million Farming Systems Development Project (FSDP). The project ran from 1981 to 1990. In 1982 farming systems activities were expanded nationwide with a $10 million agriculture component of a Rainfed Resources Development Project (RRDP). RRDP was completed in 1991.

As beneficiaries the projects targeted impoverished settlers in the rain-fed upland regions of the Philippines, a group largely overlooked by government programs. FSDP activities took place in

the Eastern Visayas, one of the poorest regions of the country (see Box 1). Both FSDP and the wider ranging RRDP emphasized farmer participation in all aspects of technology development and dissemination.

FSDP and RRDP sought to encourage upland farmers to adopt systems of sustainable farm production. Such technology transfer, however, cannot take place in a vacuum. Planners must overcome certain obstacles and meet prerequisites. For example, farmers must be convinced they can profit from adopting a new practice. Upland farmers, many of them squatters, must have assurances they will have access to the land for enough years to make change worthwhile. Moreover, the necessary institutional support for training and implementation must be put in place.

Consequently, in addition to introducing technology, the projects strove to influence government policy to help upland farmers. They sought to strengthen the capacity of NGOs, local public agencies, and local institutions to disseminate the technology and to seek public and private suppliers of planting materials, credit, and other essential inputs and services.

Evaluation Findings

Following are the evaluators' findings regarding implementation, impact, and performance of USAID's efforts to foster sustainable, environmentally sound agricultural practices on deforested slopes in the Philippines. The findings offer insights into how such efforts might be applied elsewhere.

Program Implementation

FSDP and RRDP tested and introduced workable conservation farming techniques for hillside crop cultivation. FSDP and RRDP staff tested the concept of enriched fallow: planting contoured rows of leguminous trees and nitrogen-fixing cover crops to halt soil erosion. From trial and error emerged a system known as SALT sloping agricultural lands technology. Developed originally by two Philippine NGOs, SALT is based on the cultivation of crops in "alleyways" between hedgerows of leguminous trees planted along hillsides contours. Over time (3 to 8 years, depending on slope and degree of erosion) soils in the alleyways level into terraces. If properly managed, the biomass of the hedgerows improves soil fertility in the terraces and increases crop yields.

In addition to preventing erosion, SALT reduces the land required for subsistence crops and increases the area available for income-enhancing cash crops and related farm enterprises. SALT has other advantages as well. The system lends itself to local variation as, for example, the use of hedgerow trimmings as fodder for livestock. SALT requires no sophisticated hardware. It is easily learned.

USAID provided the training. FSDP and RRDP engaged in a wide array of educational activities for their own project staff and for line-agency personnel, farmer leaders, and farmer groups. The FSDP staff directly taught courses of 3 to 5 days each at the various

project sites, reaching more than 1,000 farmers. Under RRDP more than 15,000 extension agents and farmers throughout the country attended SALT-based courses.

USAID also helped create a national training and research network. With initial FSDP support, an American university helped establish a network on conservation farming in the tropical uplands for member scientists and their organizations to conduct joint research and share their findings. This collective learning and dissemination of information should improve the long-term viability of upland farming communities and their environments.

To promote conservation farming practices, USAID encouraged a shift in Philippine Government policy that is helping upland farmers gain more secure access to the land. Since RRDP project completion, USAID has continued to help the government implement a program of "certificates of stewardship." Through the certificates, individual farmers, community organizations, and small firms gain 25-year rights to designated public upland areas. Adoption of upland conservation farming systems qualifies applicants for land access under the program.

USAID efforts helped the Philippine Government decentralize its research and extension programs. Historically, agricultural development programs in the Philippines have been centralized and ill suited to the multitude of conditions found in hilly upland regions. Through arrangements with U.S. universities, the FSDP built Philippine research and development capabilities to carry out adaptive research on farmers' fields and to involve farmers in the design and testing of new technologies.

FSDP pioneered many of the applied approaches that now are standard procedure for conducting research on upland farming throughout the Philippines. Most Philippine research institutions, both government and academic, now have farming systems research units in which researchers from different disciplines work as teams to solve agricultural problems.

USAID efforts helped build NGOs and strengthen local institutions. RRDP helped to increase the role of NGOs as change agents in the Philippines. Many former RRDP staff have organized local NGOs with a regional focus to vie for national and international funding for their conservation farming initiatives. These NGOs are attractive to donors because they operate on low budgets, have experience in field work, and have the necessary skills to undertake rural development projects. NGOs number in the thousands. Among the spin-offs from RRDP:

The "Kiblauan Rural Development Foundation" continues work in reforestation under a contract with the Department of the Environment and Natural Resources. It also is undertaking two projects with the Asian Development Bank.

The "Bundok Kalinga Foundation," with funds from the Save the Children Foundation and UNICEF, trains Philippine Government technicians in community organization for nursery management, seed

collection, and land-use planning.

The "Settlements and Livelihood Foundation" now receives financing from the Asian Development Bank to undertake community forestry projects.

RRDP also directed its efforts at developing credit institutions. In the uplands, access to credit is important but had been sorely neglected. Under the Marcos regime credit programs were virtually nonexistent, and money lenders charged usurious rates. Where credit cooperatives did exist, they were politicized, and funds were frequently diverted.

RRDP's efforts resulted in farmers associations (many of which continue in service) that make credit affordable and easy to obtain. Cooperatives extend loans for such purposes as crop production, home improvement, and medical emergencies. There is one important condition for credit: To receive loans, farmers must adopt recommended upland farming practices.

Program Impact

Agroforestry practices such as SALT are gradually replacing slash-and-burn practices in many upland areas of the Philippines. At 10 of the evaluation sites visited the evaluation team counted several hundred farm plots where SALT-based systems had been established. The evaluators noted, however, that adoption is far from uniform. Farmers normally cultivate several small plots of land as a risk-avoidance measure. Few farmers have established SALT-based systems on all the land they cultivate. As reasons for not fully adopting the technology, farmers cited the difficulty of turning oxen in the alleyways between hedgerows, and the fact that their plows get caught on the roots of the hedgerow trees.

Farmers who have embraced SALT like it because of its resilience. The technique still works even when modified. Upland farmers do not rely on agriculture alone; thus they resist technologies that demand full-time commitment. They have found they can depart from the "cookbook" model and modify SALT to meet their own time and labor considerations. Some farmers, for example, established hedgerows from sown seed. That saves labor and time over the prescribed but more tedious planting of cuttings.

Participating farmers have also rapidly diversified into growing cash crops in hedgerows and the alleyways between them. Despite the space taken up by hedgerows, net production per area unit actually increased on the newly terraced land. The increased yields allowed farmers to satisfy their subsistence-crop needs on less land. That freed land for the planting of fruits, vegetables, and industrial crops.

SALT-based cultivation, when maintained, rehabilitates and stabilizes eroded soils. Comparison of terraced and nonterraced plots shows that terracing lands reduces annual soil loss to 3.4 tons a hectare from 194 tons. Terraces typically begin to form between hedgerows within the first year of establishment; by the

end of the third year most of the leveling has occurred. Farmers report that yields steadily increase to levels that were experienced before the erosion began.

By targeting upland areas, FSDP and RRDP have reached the lowest-income rural households and many ethnic groups. The concentration of most FSDP and RRDP activities in upland rain-fed areas has ensured that farmers reached would be in the lowest income groups nationally. Even well-to-do upland farmers are poor by the standards of average lowland rice producers.

Establishing SALT requires only limited expenditures, so the technology is available to any farmer with land to cultivate. The major limiting factor for low-income farmers is the availability of family labor to establish the system. But promotion of the alayon tradition, in which neighbor helps neighbor, has largely overcome even this constraint. Training techniques such as farmer-to-farmer short courses and demonstration farming have helped project staffs surmount barriers of illiteracy as they transfer hedgerow technology.

Upland hillside cultivators can increase their labor and land productivity by shifting to SALT-based conservation farming systems. SALT-based conservation systems are sustainable over the long term if practiced properly. Furthermore, when all factors are considered time and labor investments versus yield SALT-based methods come out with a 25 percent better return than traditional slash-andburn systems.

SALT farmers sometimes generate benefits for other farmers and for landless residents as well as for themselves. They hire those individuals to help establish the hedgerow system and, later, to prune the hedgerows and care for cash crops that eventually are planted.

Program Performance

Effectiveness. SALT-based cultivation gives an overall positive return on investment to farmers who adopt the system. Published research and field data show that farmers who switch from slash-and-burn practices to hedgerow cultivation can expect an additional annual net income flow of about US$400 per hectare. The estimate is conservative, and it does not include external public benefits, such as reduced risk of flooding and better quality watersheds. Nor does it take into account the considerably greater returns that farmers can reap by switching from basic food-grain cultivation to income-earning enterprises such as wood lots, cash crops, and animal fattening. Such enterprises can help narrow the income gap between upland and lowland farmers.

Efficiency. From a development point of view, however, SALT farming has not yet spread sufficiently to cover project investments. USAID and Philippine Government investments in conservation farming through FSDP and RRDP total US$16.5 million. If farmers receive an added benefit of $400 a hectare, then 41,250 hectares (16,500,000 400) must be put under SALT cultivation for the projects to break

even. Currently about 2,000 hectares are under SALT cultivation out of a potential 9.5 million hectares of public uplands.

Sustainability and replicability. Through SALT, the Philippines now stands poised to spread, over a wide area, technologies that have not only private returns attractive enough to involve local households but also external social benefits. These include better wildlife habitats and better watersheds for irrigation and hydroelectric power.

Continuing the spread of hedgerow cultivation after RRDP falls to the nongovernmental agencies and ordinary farmers. The task seems eminently doable. USAID, the Philippine Government, and some donor-supported NGOs have already spent the funds and done the spadework to develop, introduce, and support SALT. The only additional costs for NGOs promoting hedgerow technology are those associated with the operation of the organizations themselves. Those costs are negligible. Most NGOs already have broad social goals that go beyond fostering SALT cultivation; that is, they are already operating and able to propagate sloping agricultural lands technology without any major disruption.

Effective farmer training is a key to sustaining community SALT-based programs. Here it is essential that project staff be motivated and competent. Where farmers have exposure to effective training programs, they adopt and continue to follow conservation farming practices. Where training is less effective, so is the adoption. Though SALT is relatively simple, farmers must learn specific techniques such as contouring their hedgerows. Untrained adopters tend to assume, by observation, that hedgerows are laid out straight across a slope rather than along its contour. Such assumptions invite failure.

Availability of planting materials also figures into sustainability. SALT-based cultivation is most extensive where farmers have at hand a ready supply of hedgerow seed or seedlings. Few seed companies exist in the Philippines, so providing hedgerow material becomes a government responsibility. In reality, government resources are spread too thin to allow for the development of nurseries. As a practical matter, then, it falls on farmers to provide their own hedgerow material. Some farmer cooperatives have cropped up for this purpose.

The evaluators observed that access to credit and to markets stimulated both the establishment of SALT and the integration of cash crops and livestock into livestock systems. Farmers adopting SALT must wait through a transition period of several years before their conservation methods pay off. During transition, farm income will be low. Unless there are motivating factors credit, and markets where they can sell their product farm families will not choose to endure the transition period.

The best and most frequent SALT adopters are farmers with the fewest employment alternatives. Farmers know there is little economic return in farming eroded hillsides. Without knowing how to overcome erosion, they will continue to look for other means of

earning a living.

Another inducement to adopting SALT is control of the land. Farmers are often willing to exert the extra effort to establish hedgerow technology and endure several years of lower-than-normal yields only if there is assurance that no one can claim the land on which they have invested their labor. The farmers need not own the land. They do need to feel they will have long-term access to it. With recent government policy changes, notably the granting of certificates of stewardship, farmers can have more confidence that their investment will reap enduring rewards.

Certificates of stewardship represent a significant policy shift. In all, though, USAID assistance has been able to redirect only modest levels of Philippine Government resources to foster sustainable upland farming practices. Government policy toward upland farming is largely one of benign neglect. The Government's first priority is to ensure that the country has enough rice for its citizens at a reasonable price, and rice is not an upland crop. Resources allocated to upland conservation remain inadequate. Career, salary, and support incentives for technical staff to work in upland areas are also modest.

Lessons Learned

Upland farm management systems require institutional commitment, capacity, and follow-up for their sustainability and spread. Technical assistance, vaccines for livestock, and credit for inputs are all needed to sustain upland forestry systems. Strong NGO support can make up the difference if adequately funded for a sufficient time. Local NGOs must have not only the motivation but also the communications, community organization, and technical agricultural skills. Community or farmer organizations can go far in providing follow-up support, but such groups require continued help financially and administratively. Links with national and international conservation farming networks are valuable in keeping up with this emerging field.

Systematic training is critical to adoption. Nowhere did the evaluation team see evidence of farmers adopting sustainable upland farming practices without training. One- or two-day lectures, practicums, or demonstration farm visits, though useful, are not enough to ensure sustained adoption. Moreover, farmers who try to adopt the practice on their own often commit errors that lead to poor results. Sustainable upland farm management has taken hold best where farmers have been involved in practical hands-on establishment of agroforestry systems. Farmer-to-farmer training (which can be as simple as learning while employed by other farmers) appears highly effective.

Upland farm management systems need an economic engine for sustainability and spread. Upland farm management continues and spreads best where farmers and local communities have linked it to profitable cash enterprises such as growing fruit trees or raising livestock. Where not integrated with cash enterprises, sloping agricultural land technology has been abandoned.

Land ownership is an enabling but not a critical factor in the adoption of upland hedgerow technology. The team saw many instances of adoption in which the farmer did not own the land but received the owner's permission and assurances of at least medium-term access. More secure access through certificates of stewardship or ownership should nonetheless further advance adoption.

Adoption is most easily promoted among upland farmers who have the fewest employment and land-use options. The evaluation team found that farmers most willing to adopt sustainable upland farm practices were those with no other land to farm, with no nearby open frontiers to exploit, or with few available off-farm employment options.

Availability of planting materials is critical to adoption. Timely supplies of desired seeds, seedlings, or cuttings must be on hand for farmers to use as soon after training as they are organized and ready to establish contour hedgerows. Spread of SALT has been most effective where farmers or farmer groups have begun to produce planting material on their own.

This Evaluation Highlights was prepared by Phillip Church of the Center for Development Information and Evaluation. It summarizes the findings from the CDIE Working Paper "Sustainable Agriculture and the Environment: The Philippines Case Study," (forthcoming) by Phillip Church, James Litsinger, Fred Sowers and Corazon Lamug. Readers can order copies of CDIE reports from the DISC, 1611 North Kent Street, Suite 200, Arlington, VA 22209-2111, telephone (703) 351-4006; fax (703) 351-4039.